

Massachusetts Environmental Trend Information

Supplement to MassDEP's Year-End Annual Report for FY2005

(August 18, 2006)

Introduction

This is the Massachusetts Environmental Trend Information Supplement to MassDEP's Year-End Annual Report for Fiscal Year 2005. The Year-End Annual Report and this Environmental Trend supplement were developed for the MassDEP/United States EPA-Region I Environmental Performance Partnership Agreement for 2005-2006.

This document has two parts:

- Part 1: Trend Highlights – Part 1 is a brief narrative summary highlighting some noteworthy trend information for each of the goals outlined in the 2005-2006 MassDEP Program Plan/Environmental Performance Partnership Agreement (PPA), and
- Part 2: Environmental and Programmatic Trend Data – Part 2 is a series of tables and other information (including some web links) that provides actual environmental and programmatic trend data for a variety of indicators. The narrative highlights in Part 1 were extrapolated from the trend data included in Part 2.

For more information on MassDEP's activities, including the 2005-2006 MassDEP Program Plan/Environmental Performance Partnership Agreement (PPA) and the FY05 Year-End Annual Report, please see the MassDEP website at the following URL: <http://www.mass.gov/dep/>

PART 1 – Trend Highlights (FY2005)

Goal 1: Clean Air

Levels of National Ambient Air Quality Standards (NAAQS) Pollutants

There are six principal air pollutants for which the federal government has established national ambient standards: lead (Pb), particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and ozone. The entire state has been in attainment with the national ambient air quality standards for five of these six pollutants – Pb, PM, CO, SO₂, and NO₂ -- for four years or more. Total emissions of these five air pollutants have decreased significantly since the mid-1985. CO, SO₂, NO₂, and Pb have all declined more than 60% in that time, and PM₁₀ by 22%. The state remains in non-attainment for ozone, yet there have been significant reductions in the number of exceedances of the one-hour standard (see below).

Ozone Precursors and Ambient Ozone Concentrations

Violations of the National Ambient Air Quality 8 hour Standard for Ozone have declined from a high of 243 exceedances on 43 days in 1988, to 58 exceedances on 19 days in 2005. This has come about due to the implementation of many programs designed to control emissions of Nitrogen Oxides (NO_x) and Volatile Organic Carbons (VOC), the air pollutants that are precursors to ozone. These programs include: the state's vehicle inspection and maintenance program for tailpipe emissions; requirements that automobiles meet California's more stringent tailpipe emission standards; transportation control programs designed to minimize vehicle miles traveled; stringent nitrogen dioxide controls on power plants; vapor recovery equipment at gasoline stations; reformulated gasoline; requirements on the composition of architectural coating; and controls on VOC use by manufacturers. These efforts have resulted in a 35% decline of VOC emissions between 1990 and 2002 and a 17% decline in NO_x emissions over the same time period. (2002 is the most recent data). Because much of the ozone and ozone precursors are transported into Massachusetts from other states, attainment of the standard will be dependent upon further national and regional as well as state control programs.

Goal 2: Clean Water

Bacteria Total Maximum Daily Loads (TMDLs)

Total Maximum Daily Loads (TMDLs) are extensive water quality plans that are required by federal rule to be developed for all surface waters that fail to meet national standards for human uses and for ecosystem health. A TMDL identifies the cause and sources of pollution that impair the water body, and the TMDL outlines actions that will restore water quality. In 2005, MassDEP and its consultants worked closely with EPA Region 1 to develop draft bacteria TMDLs in all 27 watersheds in the Commonwealth. The TMDLs, once approved, will address approximately 364 impaired waters throughout the Commonwealth. This project originated from the TMDL Innovations Workgroup of the New England states and EPA. MassDEP and EPA will be working closely together to finalize these TMDLs in 2006.

Assabet River Restoration

The Assabet River, which runs through eastern-central Massachusetts, fails to meet national water quality standards. A primary cause of impairment is nutrient loading (phosphorous) coming from municipal wastewater treatment plants that discharge their treated wastewater into

the Assabet. This year, MassDEP made significant progress in reducing nutrient impacts to the Assabet by jointly issuing National Pollutant Discharge Elimination System (NPDES) permits with phosphorus limits of 0.1 mg/l to the four treatment plants along the Assabet. These phosphorous limits are among the strictest in the country, and will greatly reduce the nutrient load on the river. A significant effort was put into working with the municipal permittees and the local watershed association to get them to withdraw the permit appeals they had filed, and these innovative and aggressive permits are now final.

Drinking Water Safety

Drinking water in Massachusetts comes from both surface water (rivers and reservoirs) and groundwater (pumped from underground water sources). To protect human health, the state sets health based standards for contaminants in drinking water, usually based on EPA rules. These standards specify the maximum allowable level of regulated contaminants. About 90 contaminants are now regulated in drinking water; new ones are being added regularly. We have 1,704 public water systems in Massachusetts, serving over 7 million people. Most people receive water that meets all health-based drinking water standards.

(For more information: <http://www.mass.gov/dep/water/priorities/dwhome.htm>)

Safety of Delivered Drinking Water

The percentage of public water systems that are fully complying with all of their monitoring and reporting obligations have been consistently improving for the last few years. However, the new Disinfection Byproduct Rule (DBPR) Stage 1 monitoring requirements at smaller systems, and monitoring performed in anticipation of the introduction of the forthcoming lower arsenic standard, have contributed to a slight reduction in monitoring and reporting compliance in 2005.

(For more information: <http://www.mass.gov/dep/water/priorities/metstn.htm>)

Goal 3: Preserve and Restore the Land

Solid Waste Diversion

MassDEP has set an aggressive solid waste reduction goal: the diversion of 70% of the solid waste generated in the state through a combination of source reduction, recycling, and reuse. The state has worked to meet this goal through a combination of grant and technical assistance programs for municipalities and businesses, as well as bans on the disposal of certain types of wastes, and is making progress. In 2000 the state diverted approximately 50% of the solid waste generated. In 2004 that number had risen to 54%, despite an 8% increase in the total amount of solid waste generated over the four years, and a decline in funds available for grants. In 2003, MassDEP distributed \$3.66 million in grant funds versus \$2 million in 2005.

Residential Waste Reduction Technique: "Pay as You Throw"

Encouraging communities to adopt "Pay as You Throw" (PAYT) policies for their residential solid waste disposal programs has been a key strategy MassDEP has used to make progress toward the state's 70% solid waste diversion goal. PAYT is effective because people are more likely to recycle or compost if their disposal costs are based upon the number of bags of waste they dispose of. MassDEP has awarded grants to evaluate, plan, and start up these programs as well as providing ongoing programs with access to a state negotiated (and lower priced) contract for the purchase of waste disposal bags. The number of communities implementing PAYT has grown from 95 communities in 2000 to 116 communities in 2005.

Mercury: Emission Reductions and Reduced Levels in Fish

In 1998, Massachusetts' trash incinerators were responsible for 70% of the mercury emitted in the state – approximately 8,600 pounds/year. In the late 1990s, Massachusetts implemented the strictest incinerator emission limits in the nation and a major campaign to recycle rather than dispose of mercury-containing products (such as thermostats, thermometers, and fluorescent bulbs). Since 1999, our trash incinerators have reduced their mercury emissions by more than 95% to 330 pounds/year. In 2004, the average mercury levels in fish sampled from lakes downwind of our incinerators had dropped 24-32% since the emission reduction programs went into effect. Mercury levels have also dropped in fish from other lakes across the Commonwealth, but less dramatically.

Mercury in sludge

In 2004 Massachusetts established a voluntary program encouraging dentists to install amalgam separators to collect and recycle mercury from dental fillings. By 2005 approximately 2/3rds of the dentists had participated, and the large wastewater treatment authority that serves the greater Boston area (the Massachusetts Water Resource Authority) has seen a drop in mercury concentrations in its sewage sludge from a high of 4.4 mg/kg (dry weight basis) in May 2004 to a low of 2.0 mg/kg now. Levels have been below 3.0 consistently since May 05. Massachusetts has since made this voluntary program mandatory.

Hazardous Waste Sites

The number of new spills and sites coming into the state cleanup system each year has been fairly steady since 1994 at about 1,800 per year, whereas the number of sites and spills cleaned up (aka “closed”) each year has generally increased from about 1,800/year in 2001 to about 2,300/year in 2005. Since FY2002, the number of sites closed out each year has exceeded the number of new notifications, indicating a steady decline in the number of “active” sites. Since 1994, ninety-eight percent (98%) of the sites closed have achieved a permanent solution, and ninety-three percent (93%) of the sites are clean enough to be acceptable for unrestricted use (no institutional control, or “Activity and Use Limitation”).

Potentially Responsible Parties (PRPs) Compliance

Parties that are responsible for assessing and cleaning up contaminated sites are known as “Potentially Responsible Parties.” MassDEP requires response actions at sites within specified timeframes from when the site is first discovered. For those sites where a response action is required within one year of the condition being discovered, the number of PRPs in compliance increased 3 percent in FY2005 compared to FY2004. This increase may be attributable to an increase in the number of MassDEP's enforcement actions.

Brownfields

MassDEP continues to provide significant technical outreach to brownfields project proponents through the Boston and regional offices, as well as through website and presentations, and strong coordination continues between federal and state brownfields partner agencies. MassDEP provided technical assistance to 80 brownfields project proponents in FY2005, representing a 31% increase from FY2004.

Goal 4: Healthy Communities and Ecosystems

Identifying and Preventing Wetland Loss

MassDEP has continued its efforts to generate and analyze aerial photos of the entire state to evaluate wetlands loss over time, and to identify the causes of that loss. MassDEP conducted a new over flight of the state in April 2005 to measure the extent of un-permitted fill at that time, as a first measure of our effectiveness in reducing the destruction of wetlands. We expect that analysis to be done by the fall of 2006. MassDEP staff have analyzed the data collected to date to determine what the principal causes are and how we can most effectively intervene to better protect wetlands. The most significant finding thus far, which has already changed MassDEP's focus, is that a very large portion of the wetlands filling was unpermitted. With renewed efforts to integrate assorted wetland databases, combined with the introduction of electronic applications, the agency is currently developing a link between permits issued and wetland losses identified on our maps. This will increase MassDEP's ability to quickly distinguish wetlands filling that is unpermitted from those activities that are permitted. MassDEP is undertaking a comprehensive enforcement effort to find and penalize those responsible for illegal wetlands filling. In addition, substantial efforts are being made to publicize this enforcement initiative (including the assessment of heavy penalties and requirements for restoration) in order to serve as a deterrent for others. MassDEP is also making the wetlands loss maps available to communities and the public so that a variety of stakeholders can work together toward prevention of unpermitted fill.

(For more information: <http://www.mass.gov/dep/water/priorities/idwet.htm>, and <http://www.mass.gov/dep/water/priorities/upwet.htm>)

Part 2 – Environmental & Programmatic Trend Information (FY2005)

Goal 1: Clean Air

AIR ENVIRONMENTAL INDICATORS< OUTCOMES AND OUTPUT CHARTS

Environmental Indicators	BASELINE		CY 2004 (Status and Change from Baseline)	CY 2005 Status and Change from CY 2004)
Attainment status for air pollutants with National Ambient Air Quality Standard (NAAQS) (including Redesignation of areas attaining the current NAAQS, revocations of the 1hour ozone NAAQS for areas attaining it, and designations of areas for the 8-hour ozone and PM-2.5 NAAQS*	Yr stand ard set	Status		
CO	1970	Last violation in 1986 Entire state in attainment as of 2002		
PM10 Superceded standard for TSP set in 1970	1987	Entire state in attainment as from start of monitoring		
NOX	1970	Entire state in attainment prior to 1985		
8 hr Ozone	1997	Entire state non attainment	MA recommended state-wide non-attainment status under the 8-hour ozone standard in July 2003, status finalized in April 2004	Entire state designated moderate non-attainment for 8-hour ozone in April 04 and
1 hr Ozone	1970	Entire state non attainment Standard eliminated in favor of 8 Hour Standard on June, 15 2005		1-hour Standard revoked 6/15/05 – 1 yr after effectiveness designations under 8 Hour Standard.
S02	1970	Entire state in attainment prior to 1985		

Environmental Indicators	BASELINE		CY 2004 (Status and Change from Baseline)	CY 2005 Status and Change from CY 2004)
PM2.5	1997	Entire state in attainment as of: 2004		Entire state designated attainment for PM 2.5 in Dec. 2004.
Lead	1980	Entire state in attainment prior to 1985	↑	
Trends in ambient concentrations of the “Criteria Pollutants” for which there are National Ambient Air Quality Standards from the air monitoring networks*			From CY 2003 – CY2004 (averaged across all monitors available for each pollutant)	From CY 2004 –CY 2005 ➤
CO Standard: 2 nd Maximum 8 hour value = 9 ppm	1985 Boston: 6.1 ppm (monitor w/highest reading) Lowell 8.0 ppm		Boston: ↓ 2.0 ppm (monitor w/highest reading) Lowell: ↓ 1.8 ppm	Boston: ↑ 2.3 ppm (monitor w/highest reading) Lowell: ↔ 1.8 ppm
PM10: Standard: 50 µg/m ³ (Annual Arithmetic Mean)	1985 Boston: 32 µg/m ³ Springfield 30 µg/m ³ Ware: 15 µg/m ³		↓ 20. µg/m ³	↑ 21.69. µg/m ³
NO ₂ Standard: 0.05 ppm (Annual Arithmetic Mean)	1985 Boston: 0.03 µg/m ³ Springfield: 0.02 µg/m ³ 1996 Other areas: 0.015		Boston: ↓ 0.02 µg/m ³ Springfield ↔ 0.02 µg/m ³ Other areas: ↓ 0.010 µg/m ³	Boston: ↓ 0.16 ug/m3 Springfield: . ↓ 0.17 ug/m3 Other areas: . ↓ 0.07 ug/m3
8 hr Ozone Standard: 0.085 ppm	1988 The standard was exceeded a total of 243 times on a total of 43 days		↓ The standard was exceeded a total of 19 times on a total of 8 days	↑ The standard was exceeded a total of 58 times on a total of 19 days
1 hr Ozone Standard: 0.125 ppm	1988 The standard was exceeded a total of 101 times On a total of 30 days The standard was exceeded a total of		↓ The standard was exceeded once on one day	↑ The standard was exceeded five times on three days. (The 1-hr standard was discontinued June 15, 2005)
SO ₂ Standard: Annual Arithmetic Mean =0.03 ppm	1985 0.012 ppm		↓ SO ₂ average annual average levels have declined from 0.005 ppm to .004ppm	↔ SO ₂ levels have remained stable at .004 ppm

* ECOS Core Performance Measure

Environmental Indicators	BASELINE				CY 2004 (Status and Change from Baseline)			CY 2005 Status and Change from CY 2004)		
PM _{2.5}	2003 The PM _{2.5} concentrations averaged 11.1 ug/m ³ statewide during 2003. The 98 th percentile value was 36 ug/m ³ . All monitors measured levels below the standard for both the annual and daily standard.				⇔ PM _{2.5} has remained stable with an annual average over all sites (11.1 to 11.2 ug/m ³), although the 98 th percentiles have declined from 36 to 30 ug/m ³ . All monitors measured levels below the standard for both the annual and daily standard. As mentioned in the text, data capture improved between 2003 and 2004.			⇔ PM _{2.5} has remained stable with an annual average over all sites (11.1 to 11.4 ug/m ³), although the 98 th percentiles have remained stable at 30 ug/m ³ . All monitors are measuring levels below the standard for both the annual and daily standard.		
Lead Standard: Annual arithmetic mean = 1.5 ug/m ³	0.32 ug/m ³				↓ 0.02 ug/m ³ (Pb values have been stable since the early 90s)			↓ 0.013 ug/m ³ (Pb values have been stable since the early 90s)		
Air toxics ambient data from the state's special ozone monitoring network and special monitoring studies	BASELINE Roxbury: 2001 Chicopee: 2001 *Long Island: 2001 *Lynn: 2002 * "background sites" mean values (ppb) Rox Bury Chico pee Long Island Lynn				 2004 mean values (ppb) Roxbury Long Island Lynn			 2005 mean values (ppb) Roxbury Lynn		
1,3-butadiene	0.06		0.02	0.02	0.04 ↓		0.00 ↓	0.06 ↑		0.02 ↑
1,1,1-trichloroethane	0.06		0.03	0.03	0.02 ↑		0.02 ↓	0.02 ⇔		0.02 ⇔
Trichloroethylene	0.02		0.01	0.004	0.02 ⇔		0.02 ↑	0.02 ⇔		0.02 ⇔
tetrachloroethylene	0.05		0.03	0.03	0.50 ↑		0.04 ↑	0.03 ↓		0.03 ↓
Benzene	0.37	0.25	0.19	0.19	0.28 ↓	.21 ↓	0.15 ↓	0.39 ↑		0.22 ↑
Toluene	0.84	0.50	0.34	0.33	0.76 ↓	.41 ↑	0.47 ↑	1.23 ↑		0.65 ↑
Xylenes	0.16	0.30	0.06	0.09	0.42 ↑	.11 ↓	0.19 ↑	0.32 ↓		0.08 ↓
Ethylbenzene	0.15	0.10	0.06	0.05	0.10 ↓	.06 ↓	0.06 ↑	0.16 ↑		0.05 ↓
State progress in collecting and compiling ambient and emission source data for toxics to better characterize the nature and extent of toxic air pollution	In 2003 A PM 10 sampler was installed at the Roxbury toxic site that will begin sampling for toxic metals in 2004. A GC was installed at the Ware PAMS site to allow hourly VOC data to be collected. An aethelometer was installed at the North End site. Carbonyl sampling at Chicopee was suspended due to staffing shortages (resumed in 2003).				In 2004 The toxics VOC data, taken from samples collected at Roxbury, Long Island and Lynn over the last several years has been formatted and submitted to AIRS. Chromium +6 sampling began at Roxbury in January, 2005. The National Air Toxics Trends Site in Roxbury received a new shelter in October, 2004. The PAMs sampling equipment, previously located at Truro and Fairhaven, was moved to Long Island and operated during the 2004 PAMs season.			In 2005: There were no major changes in Toxics or PAMS in 2005, other than the start of the replacement of aging equipment at the PAMS sites. The average Chromium+6 concentration detected at Roxbury in 2005 was 0.036 nanograms per cubic meter and the maximum one day value was 0.18 nanograms per cubic meter.		

Environmental Indicators	BASILINE	CY 2004 (Status and Change from Baseline)	CY 2005 Status and Change from CY 2004)

Outcomes	BASELINE:		CY 2002 (most recent data)	
Emissions reductions since 1990 for each criteria pollutant* (Based on most recent inventory data: 2002)	1990: EMISSIONS: VOC: 1,070 Tons NOx:- 925 Tons SO2:- 6,493 Tons CO: 1,007 Tons		Emission change from 1990-2004: VOC: ↓↓ 35% NOx: ↓↓ 17 % SO2: ↓↓ 56% CO: ↓↓ 35%	
Share of emissions of VOC (Based on most recent inventory data: 2002)	1990 Point Sources Area Sources On Road Mobile Sources Off-Road Mobile Sources	6% 34% 33% 26%	Point Sources Area Sources On Road Mobile Sources Off-Road Mobile Sources	2% 44% 22% 32%
Share of emissions of, NOX (Based on most recent inventory data: 2002)	1990 Point Sources Area Sources On Road Mobile Sources Off-Road Mobile Sources	34% 4% 49% 13%	Point Sources Area Sources On Road Mobile Sources Off-Road Mobile Sources	13% 4% 47% 15%

Outputs	CY 2003	CY 2004	CY 2005
# of gas stations and automotive dealers trained and certified in the Enhanced Inspection and Maintenance Program	<ul style="list-style-type: none"> ➤ 1579 stations tested vehicles (1470 public stations and 109 fleet-only stations) ➤ 4,560 Inspectors conducted inspections ➤ Over 950 Registered Repairers trained in emission repairs were associated with over 650 Registered Repair Facilities 	<ul style="list-style-type: none"> ➤ 1,660 stations tested vehicles (1,552 public stations and 108 fleet-only stations) ➤ 5,950 Inspectors conducted inspections ➤ Over 950 Registered Repairers trained in emission repairs were associated with over 625 Registered Repair Facilities 	<ul style="list-style-type: none"> ➤ 1,655 stations tested vehicles (1,548 public stations and 107 fleet-only stations) ➤ 5,871 Inspectors conducted inspections ➤ Over 950 Registered Repairers trained in emission repairs were associated with over 650 Registered Repair Facilities ➤ MassDEP has established Mandatory OBDII training for registered repairers, which began in 2005 and will be completed in offered throughout the summer and fall. All repairers must complete training to retain status

* ECOS Core Performance Measure

Outputs	CY 2003	CY 2004	CY 2005
# and % of gas stations that self certified in the Stage II Vapor Recovery Program and % of gasoline dispensed through certified systems	Baseline FFY 03 # Certifications received: 2789 % of gas stations certifying: 97% % of gas dispensed through certified systems: 98%	# Certifications received: 2657 % of gas stations certifying: 91% % of gas dispensed through certified systems: 93%	# Certifications received: 2984 % of gas stations certifying: 98% % of gas dispensed through certified systems: 98%
# of companies with 1,000+ employees which have submitted Rideshare Reports	FFY 02 242 Reports from in FFY 02	113 Reports for FFY 04	184 reports received in FFY 05

AMBIENT AIR QUALITY AND EMISSIONS

Despite increases in activities that contribute to air pollution such as fuel use, economic activity, and vehicle miles traveled, Massachusetts' air quality has improved significantly over the 18-year period from 1985 to 2003. Massachusetts' air quality complies with the National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Lead (Pb), Particulate Matter –10 (PM₁₀), Nitrogen Dioxide (NO₂).

All PM 2.5 monitors in the state are measuring levels below the PM 2.5 standards. Ozone is the only NAAQS that MA is violating.

However, the number and magnitude of exceedances of the 1-hour ozone standard have declined significantly since the 1980s. The improvements in the 1-hour ambient ozone levels have coincided with the implementation in-state and throughout the Ozone Transport Region (the "northeast corridor") of major state and federal programs designed to reduce ozone precursor emissions from industries, power plants, vehicles, and consumer products that contribute to ambient air pollution. Additional reductions in precursor emissions, especially from upwind sources, will be needed if Massachusetts is to attain the 8-hour ozone standard that was adopted in 1997.

Ambient Air Quality

NAAQS Pollutants

DEP's air quality monitoring network for criteria pollutants has measured the following changes:

- CO concentrations have declined by 70% from 1985 to 2005
- SO₂ concentrations have declined by 64% from 1986 to 2005
- NO₂ concentrations have declined by 62% from 1985 to 2005
- Pb concentrations have declined by 87% from 1987 to 2005
- PM₁₀ concentrations have declined by 22% from 1989 to 2005

The trends for SO₂, CO, NO₂, Pb, and PM₁₀ have been relatively stable over the last six years, at levels below the applicable standards.

Exceedances of the 1-hour Ozone (O₃) standard have declined from as many as 109 exceedances per ozone season from 1987 – 1995 down to 10 or less per ozone season since 1995, with the exception of 2002 when there were 22 exceedances. The number of *days* when the 1-hour standard was exceeded dropped from around 10 per ozone season during the late 1980s and 1990s to 7 or fewer days per ozone season in the most recent 3 years.

The number of days that the more stringent 8-hour O₃ standard has been exceeded, however, has been fairly stable over roughly the same time period (typically in the 20-30 day range) However, the total number of measured 8-hour exceedances at all monitors (as opposed to days on which the standard was exceeded at one or more monitors) has displayed less stability, ranging from a high of 264 in 1988 to a low of 15 in 2000. The average number of measured 8-hour exceedances per year has been 83 over the period 1985 to 2003. In 2005 there were 58 exceedances on 19 days.

Ozone, in particular, can exhibit striking year-to-year variations since meteorological fluctuations significantly influence the chemical processes that produce ozone as well as the quality of the air masses entering Massachusetts.

PM_{2.5} average annual means have generally declined since monitoring started in 1999 (the average annual mean for sites existing in 2005 is down from 12.7 ug/m³ in 1999 to 11.3 in 2005). However, average peak values represented by the 98th percentile have fluctuated between 30 and 40 ug/m³ over the same period with no clear trend (for sites existing in 2005). More data will be needed to determine whether these constitute a longer term trend.

Air Toxics data from the PAMS Network (1998 to 2005)

Lynn and Chicopee Data: MADEP collects 24-hour hydrocarbon and carbonyl samples every six days year round at the Lynn and Chicopee sites. Values for several health relevant compounds (formaldehyde, acetaldehyde, benzene, toluene, and xylene) are extracted from either the hydrocarbon or carbonyl analyses. The data gathered at the Lynn and Chicopee PAMS sites show a relatively large decrease in benzene, toluene and xylene values between 1994 and 1995, likely the result of the use of reformulated gas, first introduced in 1995. However, the trend for these three chemicals for the past four years has been relatively flat.

Roxbury and Long Island Data: In 2000 DEP began collecting selected air toxic samples at the Roxbury and Long Island monitoring sites. (Long Island air toxics sampler discontinued in 2002; Lynn has been designated for air toxics since then.) Air toxics data, collected at these locations over the last five (5) years, should provide good information relative to background concentrations in the Boston Area.

Ozone Precursors Trends Analysis:

Benzene, Toluene, and Xylenes levels monitored in Lynn and Chicopee since 1994 have declined by approximately 70% since 1994. However most of that decline occurred between the 1994 and 1995 monitoring seasons, probably as a result of reformulated gasoline being introduced in 1995. Ethyl Benzene values have stayed relatively stable during the entire period. Over the past four years values for all these compounds have been relatively flat.

- While the 18-year (1985-2003) trend for NO₂ indicates a decline in annual NO₂ average values of approximately 56%. The 6-year NO₂ trend (1997-2002) had reached a plateau, with an annual NO₂ average of approximately 0.015 ppm being observed during this period. However, in 2003, NO₂ levels dropped to 0.013. These concentrations are all well below the ambient NO₂ standard of 0.053 ppm. The annual average for NO₂ in 2005 was .011 ppm.

Emissions Reductions Trends Analysis

Emissions inventories are updated every three years. DEP is currently finalizing a 2002 emissions inventory. Preliminary 2002 data was submitted to EPA in June 2004 and will be issued for public comment in 2006. Emission trends are shown from 1990 through 2002, based on the preliminary 2002 inventory data. The trends illustrate success in moving toward the goal of ensuring that citizens have clean air to breathe, and corroborate the gains seen in ambient air quality. Programs that are being implemented subsequent to 2002 such as low sulfur fuel and California Low Emission Vehicle Standards will ensure continued downward trends in emissions of motor vehicle-related criteria pollutants and their precursors, and should lead to continued progress toward reducing 8-hour ozone concentrations, and continued attainment of the standards for the other pollutants. Attainment of the 8-hour standard will be dependent on further national, regional and state emission reduction programs.

VOC Emissions Trend: 1990 to 2002: - 35 %

The 1990 to 2002 VOC reductions are the result of controls that DEP implemented to meet provisions of the federal Clean Air Act (CAA) Amendments of 1990 for geographical areas not meeting the health-based ozone ambient standards. These control measures include: Basic automobile control Inspection and Maintenance (I/M) and, since 1999, Enhanced I/M, Federal Motor Vehicle Control Program, California LEV since 1995, Reasonable Available Control Technology (RACT) requirements for point sources, Stage II Vapor Recovery for Gasoline Stations, Architectural Coatings (i.e., lower paint emissions), and Reformulated Gasoline. On-road

mobile VOC emissions were reduced by 57% during this period, despite a continued increase in vehicle miles traveled.

NOx Emissions Trend: 1990 to 2002: - 17%

The 1990-2002 NOx reductions are based on controls that DEP implemented to meet the NOx provisions of the federal Clean Air Act (CAA) Amendments of 1990 for geographical areas not meeting the health-based ozone ambient standards. Emission reductions from 1990 to 2002 were derived from control measures such as: Basic and Enhanced I/M, Federal Motor Vehicle Control Program, California LEV and Reasonable Available Control Technology (RACT) on combustion units on point sources (industries, utilities). These reductions were achieved despite overall economic growth during this time period. Point source NOx emissions, primarily power plants, were reduced by 59% for this period. Area source emissions decreased by 10%. On-road mobile emissions were unchanged at the end of this period while off-road mobile emissions increased by 18%. Off-road NOx mobile emissions are expected to decrease in future years as new control programs are implemented.

SO₂ Emission Trends: 1990 to 2002: - 56 %

SO₂ emissions are tracked annually as part of the requirements of the 1985 State Acid Rain (STAR) program. Nearly all SO₂ emissions are from large point sources, especially power plants. The STAR program established a 412,000-ton state cap, which is more stringent than the federal acid rain program. The SO₂ emission estimate for 2002 is 161,500 tons, which is significantly lower than the cap. Reductions are the result of emission controls.

CO Emission Trends: 1990 to 2002: - 35%

There was a 54% reduction in on-road mobile emissions during this period as a result of the on-road mobile source programs described above under VOC and NOx trends. This decrease in mobile emissions was partially offset by a 17% increase in off-road CO emissions. There was a 17% decrease during this period in point source CO emissions.

Goal 2: Clean and Safe Water

National Status and EPA Strategies

Over the 30 years since the enactment of the Clean Water and Safe Drinking Water Acts, government, citizens, and the private sector have worked together to make dramatic progress in improving the quality of surface waters and drinking water. Today, drinking water is treated to be safe at the faucet end and protected at the source. Today, the number of polluted waters has been dramatically reduced, and many clean waters are even healthier. A massive investment of federal, state, and local funds has resulted in a new generation of sewage treatment facilities able to provide “secondary” treatment or better. More than 50 categories of industry now comply with nationally consistent discharge regulations. In addition, sustained efforts to implement “best management practices” have helped reduce runoff of pollutants from diffuse, or “nonpoint,” sources. But despite these outstanding improvements, population growth continues to generate higher levels of water pollution and places greater demand on drinking-water systems. To further our progress toward clean waters and safer drinking water, we must both maintain our commitment to the core measures we have already established and look for new ways to improve water quality and protect human health.

Massachusetts 2005-2006 PPA Water Program

In the 2005-2006 Performance Partnership Agreement (PPA) DEP piloted an innovative approach to the development of environmental goals and the work plans needed to achieve those goals and disseminated them via the Internet. Consistent with this approach, trend information for Clean Water and Healthy Ecosystems may be found at <http://www.mass.gov/dep/water/priorities/ssgwhome.htm> and information on Intact and Functioning Wetlands <http://www.mass.gov/dep/water/priorities/wethome.htm>. The progress towards strategic priorities for Clean and Safe Water is outlined below.

The following is a summary of progress on strategic priorities identified in the Performance Partnership Agreement during 2004 and 2005.

Restoring Impaired Waters

FFY 04-05 Outputs:

- Pursue innovative approaches to TMDL-development and to addressing water quality impairments through the Assabet River and Massachusetts Estuaries projects described in detail below
Update: The Assabet River TMDL was completed and approved by EPA during FY04. The Chatham TMDL (addressing 5 estuaries) was finalized after a public meeting and submitted to EPA for approval during FY04. Bacteria TMDLs were finalized after a public meeting for Frost Fish Creek and Muddy Creek in Chatham and are awaiting EPA approval. Technical reports and draft TMDLs were developed for Popponessett Bay and Quashnet River during the first quarter of FFY05. Several additional technical reports are under development.
- Continue to work with EPA Region 1, other New England States, and the New England Interstate Water Pollution Control Commission to identify waters where other activities or plans are in place and can serve as “TMDL Equivalent” plans. Once identified and agreed to, these waters can be moved from Category 5 of the State Integrated List of Waters to Category 4b. TMDLs would then not be needed and existing plans would address the water quality impairment.
Update: Several meetings with Region 1 were held during FFY04 and are continuing. MA has developed an innovative project to move waters impaired from atmospheric mercury to category 4b of the integrated list. The final plan and revised list will be submitted to EPA in FFY05. MA and EPA Region 1 are also working together to develop a statewide generic bacteria TMDL with the completion goal in late 2005. MA is also participating with other New England States, Region 1, and ENSR International in the development of a simplified storm water TMDL using the impervious cover methodology.
- In FY 04 continue to develop and finalize nutrient TMDLs for 5 Chatham embayments, the Assabet River (13 TMDLs), the Kickemuit River and bacterial TMDLs for Muddy Creek, Frost Fish Creek. Also finalize TMDLs for the Shawsheen headwaters (habitat impairment) and Palmer River (13 bacterial TMDLs)

Update: See bullet above for update on the Assabet River and MA Estuaries Project. MA is still waiting for RI to set up public meeting on the Kickemuit TMDL and is evaluating legal options to finalize the Shawsheen headwaters TMDL. The Palmer River TMDL was finalized and approved by EPA in FFY04.

- Continue work on additional TMDLs where data collection and related activities have commenced including the Nashua River, Charles River, Popponessett Bay, Waquoit Bay sub-systems, Great, Green, Bournes and Quaboag Ponds, Oyster Harbor and Nantucket Harbor
Update: Nashua model has been finalized and options analysis is underway. Charles River is under contract to CRWA and making progress. Popponessett bay tech report and draft TMDL have been completed with public meeting scheduled for March 30, 2005. Quashnet River (Waquoit Bay) tech report and draft TMDL completed and under internal review and should be completed in FFY05. Draft tech report for Great, Green, and Bournes Ponds completed and under internal review. Data collection completed and TMDL evaluation under way for Quaboag/South Pond system and is on schedule for completion during FFY05. Draft tech Report for Oyster Pond (bacteria TMDL) under development. Data collection still under way for Nantucket bacteria TMDL.
- Commence work on other TMDLs as resources allow and as negotiated with EPA during the 2004-2005 period

- Assabet River Phosphorus Loading Project - Nutrients

FFY 2004-2005 Outputs:

- Development of draft and final TMDL for nutrients
Update: completed and approved
- Hold public meetings
Update: completed
- Respond to comments and finalize TMDL for submittal to EPA for approval
Update: completed
- Develop Draft and Final NPDES permits with EPA
Update: draft completed in FFY04; final pending
- Hold Public hearings if necessary in 2004 and finalize permits
Update: completed
- Work with the Army Corps of Engineers and Assabet River stakeholders to develop scope of work for sediment/dam removal feasibility study
Update: agreement w/ACOE completed, partial funding transferred; preliminary scope of work developed with stakeholders
- Finalize initial work with USGS on sediment quality data collection and interpretation
Update: field work completed, awaiting final report
- Begin development of a monitoring plan to implement and assess progress as the phased approach is implemented.
Update: initial draft developed and under internal review

Massachusetts Estuaries Project - Nutrients

FFY2004-2005 Outputs:

- Conduct on-going data gathering and modeling activities during 2004-05, including:
 - Complete draft technical reports for 15 embayments in FFY04, including the five already completed Chatham reports
Update: as of 10/04 9 completed including Chatham (5), Popponessett (1), and Quashnet (3)
 - Complete final technical reports for 11 embayments in FFY04, including the five Chatham reports
Update: as of 10/04 completed 6 Final tech reports including Chatham(5) and Popponessett (1)

- Complete draft technical reports on 7 additional embayments in FFY05
Update: additional draft tech reports completed in FFY05 include Great Pond, Green Pond, Bournes Pond; work under way on Oyster Pond, Three Bays, Wareham River, West Falmouth Harbor, New Bedford Inner Harbor, and Pleasant Bay (3).
- Complete final technical reports on 9 additional embayments in FFY05
Update: current schedule calls for finalizing Quashnet (3), Great Pond, Green Pond, Bournes Pond, Little Pond, Oyster Pond, Three Bays, Wareham River, and West Falmouth Harbor
- Prepare TMDL's for 7 embayments in FFY 2004, and 10 embayments in FFY05
Update: 8 draft TMDLs prepared in FFY04 including Chatham (5), Quashnet (3), Popponessett Bay (1), Frost Fish Creek bacteria (1), Muddy Creek bacteria (1)
- Initiate data gathering and modeling in 12 new embayments in FFY04, and in 11 embayments in FFY05
Update: data gathering under way in 49 embayments; modeling under way in most waters identified above where draft technical report development is underway for FFY05.
- Continue pre-technical assessment nutrient monitoring in an additional 64 embayments through FY04-05 in anticipation of doing modeling and preparing technical reports and TMDL's in those basins in future years.
Update: data gathering under way in 49 embayments

Combined Sewer Wet Weather Overflows (CSO's)

FFY 2004-2005 Outputs:

- Review SRF applications for CSO funding-**Ongoing**
- Provide SRF funding to eligible projects, DEP estimates range up to \$100 million over the next two calendar years
Status Ongoing
- Technical assistance to communities
Status Ongoing
- Review draft and final CSO plans for compliance with the Clean Water Act and State Water Quality Standards
Status Ongoing
- Review Water Quality Standard classifications for CSO-impacted receiving waters during the CSO planning process
Status Ongoing
- Negotiate Orders with EPA and Court parties to establish construction schedules for CSO abatement work
Status Ongoing
- Work with EPA and watershed groups to review water quality information on CSO discharges and their impacts.
Status Ongoing
- *Restore Mount Hope Bay: Improve Fisheries Habitat by Reducing Thermal Load at Brayton Pt*

FFY 2004-2005 Outputs:

- The appeal of the conditions of the NPDES permit will require USEPA and MADEP to spend considerable time preparing briefs for submittal to the USEPA Appeals Board. It is anticipated that the appeal process could take several months or longer in 2004-2005.
Status Ongoing

Environmental Goals Pilot Project for Selected Water Programs

FFY 2004-2005 Outputs:

- DEP expects to have that data live on the web by early summer 2004. Because DEP anticipates making the information available on the web, much less detail has been included in the written PPA.

Update: Environmental Progress Report is posted on the Web.

Drinking Water Targets

- Set standards for safe drinking water at PWS
- Know if delivered water is meeting standards
- Assure compliance with drinking water standards
- Support private water supply safety
- Protect existing sources
- Identify and protect future sources of drinking water

Health and Safety Targets

- Promote wise use of water supply we have
 - Maintain adequate pressure for fire fighting
 - Assure capacity to respond to emergencies
-

2005 Highlights in meeting objective

In 2005, DEP had several successes in advancing this goal. These included:

- Maintaining high compliance rates across all program areas
- Identifying unregistered public water systems and bringing them into compliance.
- Obtaining grant funds to provide testing and education for daycare facilities on lead in drinking water.
- Continuing a program to get all schools tested for lead in their drinking water.
- Encouraging and requiring completion of New System Business Plans, emergency response plans and capital improvement plans

DEP conducted these training or outreach sessions:

- Annual meeting of the Massachusetts Health Officers Association
 - NEWWA Bedrock Well Courses
 - Small system operator training
 - Cross Connection Control
 - Underground Injection control.
-

Environmental Indicators and other Performance Measures

Environmental Indicators	FY 2003	FY 2004	FY 2005
# and % of community and non-transient non-community water systems (and population served) with one or more violations of health-based requirements during the year, reported separately for violations of the Total Coliform Rule (TCR), Radionuclides, chemical contaminants, Lead and Copper Rule (LCR), Surface Water Treatment Rule (SWTR), and all other regulated contaminants ¹	[Reporting data in this format is not required in 2003. See next row.]	[Reporting data in this format is not required in 2004. See next row.]	[Reporting data in this format is not required in 2005. See next row.]
# of: a) community drinking water	For Community and Non-	For Community and Non-	For Community and Non-

¹ **Note:** "Health-based requirements" were interpreted as MCL violations for TCR and nitrate, failure to install optimal treatments for LCR, failure to filter for SWTR, and MCL violations for other regulated contaminants.

Environmental Indicators	FFY 2003	FY 2004	FY 2005
systems and % of population served by community water systems, and b) non-transient, non-community drinking water systems and % of population served by such systems, with no violations during the year of any federally enforceable health-based standard (EPA will develop language clarifying meaning of “federally enforceable”)*	<p>transient non-community systems (NTNC) only</p> <p>TCR: Community</p> <ul style="list-style-type: none"> ➤ Acute MCL – 502 systems serving 98% population; ➤ Monthly MCL – 474 systems serving 95% population. <p>TCR: NTNC</p> <ul style="list-style-type: none"> ➤ Acute MCL – 249 systems serving 99% population; ➤ Monthly MCL – 234 systems serving 91% population. <p>Nitrate: Community 513 systems serving 100% population.</p> <p>Nitrate: NTNC 248 systems serving >99% population.</p> <p>Nitrites: Community 512 systems serving >99% population.</p> <p>Nitrites: NTNC 250 systems, 100% population.</p> <p>Radiological: Community 513 systems, 100% population.</p> <p>Radiological: NTNC N/A</p> <p>IOC: Community 513 systems, 100% population.</p> <p>IOC: NTNC 250 systems, 100% population.</p> <p>TTHM/HAA5: Community 512 systems serving >99% population.</p> <p>TTHM/HAA5: NTNC N/A</p> <p>SOC: COMMUNITY 513 systems, 100% population.</p> <p>SOC: NTNC 250 systems, 100% population.</p> <p>VOC: Community 512 systems serving >99% population.</p> <p>VOC: NTNC 250 systems, 100% population.</p> <p>LCR: Community 494 systems serving 96% population.</p> <p>LCR: NTNC 249 systems serving 99% population.</p> <p>SWTR: Community 165 systems serving 99% population.</p> <p>SWTR: NTNC 2 systems serving 100% population.</p>	<p>transient non-community systems (NTNC) only</p> <p>TCR: Community</p> <ul style="list-style-type: none"> ➤ Acute MCL – 504 systems serving 95% population; ➤ Monthly MCL – 462 systems serving 88% population. <p>TCR: NTNC</p> <ul style="list-style-type: none"> ➤ Acute MCL – 251 systems serving 96% population; ➤ Monthly MCL – 236 systems serving 94% population. <p>Nitrate: Community 516 systems serving 100% population.</p> <p>Nitrate: NTNC 252 systems serving >99% population.</p> <p>Nitrites: Community 516 systems serving 100% population.</p> <p>Nitrites: NTNC 253 systems, 100% population.</p> <p>Radiological: Community 513 systems serving >99% population.</p> <p>Radiological: NTNC N/A</p> <p>IOC: Community 516 systems, 100% population.</p> <p>IOC: NTNC 252 systems serving 99% population.</p> <p>STAGE 1 DBPR: Community 513 systems serving 99% population.</p> <p>STAGE 1 DBPR: NTNC 253 systems serving 100% population</p> <p>SOC: COMMUNITY 516 systems, 100% population.</p> <p>SOC: NTNC 253 systems, 100% population.</p> <p>VOC: Community 515 systems serving >99% population.</p> <p>VOC: NTNC 252 systems serving >99% population.</p> <p>LCR: Community 504 systems serving 98% population.</p> <p>LCR: NTNC 249 systems serving 98% population.</p> <p>SWTR/IESWTR: Community 164 systems serving 99% population.</p> <p>SWTR/IESWTR: NTNC 3 systems serving 100% population.</p>	<p>transient non-community systems (NTNC) only</p> <p>TCR: Community</p> <ul style="list-style-type: none"> ➤ Acute MCL – 511 systems serving 99% population; ➤ Monthly MCL – 478 systems serving 94% population. <p>TCR: NTNC</p> <ul style="list-style-type: none"> ➤ Acute MCL – 248 systems serving >99% population; ➤ Monthly MCL – 237 systems serving 98% population. <p>Nitrate: Community 514 systems serving 100% population.</p> <p>Nitrate: NTNC 249 systems serving 100% population.</p> <p>Nitrites: Community 514 systems serving 100% population.</p> <p>Nitrites: NTNC 249 systems, 100% population.</p> <p>Radiological: Community 510 systems serving >99% population.</p> <p>Radiological: NTNC N/A</p> <p>IOC: Community 516 systems, 100% population.</p> <p>IOC: NTNC 249 systems serving 100% population.</p> <p>STAGE 1 DBPR: Community 507 systems serving 99% population.</p> <p>STAGE 1 DBPR: NTNC 249 systems serving 100% population</p> <p>SOC: COMMUNITY 514 systems, 100% population.</p> <p>SOC: NTNC 249 systems, 100% population.</p> <p>VOC: Community 513 systems serving >99% population.</p> <p>VOC: NTNC 249 systems serving 100% population.</p> <p>LCR: Community 502 systems serving 97% population.</p> <p>LCR: NTNC 244 systems serving 96% population.</p> <p>SWTR/IESWTR: Community 166 systems serving 99% population.</p> <p>SWTR/IESWTR: NTNC 5 systems serving 100% population.</p>

* ECOS Core Performance Measure

Environmental Indicators	FFY 2003	FY 2004	FY 2005
# of waterborne disease outbreaks (<i>Cryptosporidium</i> , <i>Giardia</i> , <i>enteric virus</i> and <i>bacteria</i>)	No outbreaks.	No outbreaks.	No outbreaks.

Outcomes	FFY 2003	FY 2004	FY 2005
Estimated number of community water systems (and estimated % of population served) implementing a multiple barrier approach to prevent drinking water contamination (EPA and States will expeditiously define “multiple barrier approach”)*	<i>511 community public water systems (>99%) have multiple barriers (more than 1 barrier) to prevent drinking water contamination. Multiple barriers may include source protection, source water assessments (SWAP), treatment (including disinfection), distribution protection, adequate capacity, and certified operators. Specific tabulations for each of these barriers are included elsewhere in this report. Program descriptions, policies, and standard operation procedures for each of these barriers were previously provided to EPA.</i>	<i>522 community public water systems (100%) have multiple barriers (more than 1 barrier) to prevent drinking water contamination. Multiple barriers may include source protection, source water assessments (SWAP), treatment (including disinfection), distribution protection, adequate capacity, and certified operators. Specific tabulations for each of these barriers are included elsewhere in this report. Program descriptions, policies, and standard operation procedures for each of these barriers were previously provided to EPA.</i>	<i>514 community public water systems (100%) have multiple barriers (more than 1 barrier) to prevent drinking water contamination. Multiple barriers may include source protection, source water assessments (SWAP), treatment (including disinfection), distribution protection, adequate capacity, and certified operators. Specific tabulations for each of these barriers are included elsewhere in this report. Program descriptions, policies, and standard operation procedures for each of these barriers were previously provided to EPA.</i>
# and % of systems with approved distribution protection plans*	516 Community systems (100%); 247 NTNC (99%); 898 TNC (98%).	522 COM (100%) 249 out of 255 NTNC (97.6%) 892 out of 934 TNC (95.5%)	514 COM (100%) 247 out of 249 NTNC (99.2%) 909 out of 930 TNC (97.7%)
# and % of systems with boil orders for bacteria that are returned to compliance	Five systems out of 1,681 (0.3%)	Six systems out of 1,691 (0.4%)	Four systems out of 1,693 (0.2%)
# of newly identified systems with MCL violations²	<ul style="list-style-type: none"> 1 system (TNC, Monthly MCL violation for TCR) 	<ul style="list-style-type: none"> 3 systems (COM: Acute MCL violation for TCR; COM: Monthly MCL violation for TCR; TNC: Both Acute MCL and Monthly MCL violations for TCR) 	<ul style="list-style-type: none"> 2 systems (NTNC: Monthly MCL violation for TCR; TNC: Monthly MCL violation for TCR)
# and % of systems exceeding the lead action level	13 systems (2%) (Community and NTNC only)	57 systems (7%) (Community and NTNC in most recent monitoring round)	68 systems (9%) (Community and NTNC in most recent monitoring round)
# and % of exceedances of the Action Level for lead resolved as a result of the DEP/DPH Referral Program for Lead Poisoned Children	<ul style="list-style-type: none"> None reported in FFY2003. 	<ul style="list-style-type: none"> None reported in FFY2004 	<ul style="list-style-type: none"> None reported in FFY2005

* ECOS Core Performance Measure

² **Note:** “Health-based requirements” were interpreted as MCL violations for TCR and nitrate, failure to install optimal treatments for LCR, failure to filter for SWTR, and MCL violations for other regulated contaminants.

Outcomes	FFY 2003	FY 2004	FY 2005
# and % of systems with improved capacity	<p>Community and Non-transient non-community systems:</p> <p>140 systems (19%). This includes 64 during CCE inspections; 79 that received capacity assessments with a sanitary survey; and 16 systems that received SRF funding.</p> <p>Transient non-community systems:</p> <p>46 systems (5%) that received CCE inspections with preliminary capacity review.</p>	<p>Community and Non-transient non-community systems:</p> <p>157 systems (21%). This includes 19 during CCE inspections; 108 that received capacity assessments with a sanitary survey; and 30 systems that received SRF funding.</p> <p>Transient non-community systems:</p> <p>56 systems (7%) that received CCE inspections with preliminary capacity review.</p>	<p>Community and Non-transient non-community systems:</p> <p>175 systems (23%). This includes 38 during CCE inspections; 123 that received capacity assessments with a sanitary survey; and 14 systems that received SRF funding.</p> <p>Transient non-community systems:</p> <p>28 systems (3%) that received CCE inspections with preliminary capacity review.</p>
# and % of systems with certified operator	<ul style="list-style-type: none"> 1,672 (99.5%) 	<ul style="list-style-type: none"> 1,611 (95.3%) (Primary operators) 	<ul style="list-style-type: none"> 1,635 (96.6%) (Primary operators)
# and % of systems who completed Consumer Confidence Reports	512 (99.6%)	499 (96.7%)	508 (98.8%)

Outputs	FFY 2003	FY 2004	FY 2005
# of Comprehensive Compliance Evaluations (CCEs)	<i>64 CCE surveys were completed.</i>	<i>19 CCE surveys were completed.</i>	<i>38 CCE surveys were completed.</i>
Progress on DEP/EPA developed pilot program for risk-based program	N/A	DEP is continuing to use its' risk based criteria to select sanitary surveys. The selection criteria are public health related, based on the documented compliance history of all community and non-transient non-community systems and use data available in the state database. For more details on this program see http://www.mass.gov/dep/brp/epp/dw/ascomwp.html .	DEP is continuing to use its' risk based criteria to select sanitary surveys. The selection criteria are public health related, based on the documented compliance history of all community and non-transient non-community systems and use data available in the state database. For more details on this program see http://www.mass.gov/dep/water/priorities/ascomwp.htm .
# of sanitary surveys	125 sanitary surveys were completed, including 5 Comprehensive Performance Evaluations.	164 sanitary surveys were completed, including 3 Comprehensive Performance Evaluations (CPE). Additionally, 798 self surveys from TNCs were received.	161 sanitary surveys were completed, including 3 Comprehensive Performance Evaluations (CPE). Additionally, 28 self surveys from TNCs were received.
# of UIC inspections, wells returned to compliance, and outreach events (1999 text)	<p>106 inspections;</p> <p>32 Enforcement actions;</p> <p>62 UIC wells returned to compliance:</p> <p>-31 Non-voluntary (after enforcement);</p> <p>-31 Voluntary (without enforcement).</p> <p>8 Outreach events.</p>	<p>42 Registrations with out inspection</p> <p>33 Inspections;</p> <p>26 Enforcement actions (18 notices of noncompliance (NONs) & 8 higher level enforcement (HLE)</p> <p>66 UIC wells returned to compliance:</p> <p>35 Non-voluntary (after enforcement);</p> <p>31 Voluntary (without enforcement);</p> <p>18 Outreach events</p>	<p>98 Registrations without inspection</p> <p>751 Inspections;</p> <p>178 Enforcement actions;</p> <p>138 UIC wells returned to compliance:</p> <p>42 Non-voluntary (after enforcement);</p> <p>27 Voluntary (without enforcement);</p> <p>16 Outreach events</p> <p><i>Note: FFY05 is the first year to include reporting of UIC activities conducted by other MassDEP programs.</i></p>
# of on-site laboratory audits/inspections	36 inspections total (20 chemistry on-site inspections and 16 microbiology inspections) were conducted for laboratories performing analysis of drinking	52 inspections total (16 chemistry on-site inspections and 36 microbiology inspections) were conducted for laboratories performing	48 inspections total (16 chemistry on-site inspections and 32 microbiology inspections) were conducted for laboratories performing

Outputs	FFY 2003	FY 2004	FY 2005
	<i>water.</i>	analysis of drinking water.	analysis of drinking water.
<p># of laboratories certified for microbiological and chemical analyses under the SDWA certification program</p> <p>In 2004, DEP will maintain commitment to timely on-site drinking water laboratory audits/inspections – all remaining state microbiological laboratories will be complete by Dec 31, 2004 (app. 36 inspections in 2004)</p>	<p>In-state Laboratories 97 laboratories are located in Massachusetts: 33 are certified to analyze one or more chemical contaminants in potable waters; 72 are certified to analyze for microbiological contaminants.</p> <p>Out-of-state Laboratories There are 69 laboratories located outside Massachusetts: 54 are certified to analyze one or more chemical contaminants in potable water; 10 are certified to analyze for microbiological contaminants.</p> <p>At the end of December 2002, the principal microbiology laboratory certification officer position was filled as a NEIWPCC contractor, supported with federal set-aside funds provided by the U.S. EPA directly to the NEIWPCC. In June 2003, the microbiology laboratory certification officer successfully completed the U.S. EPA Microbiology Laboratory Certification Officer Training Course held at the U.S. EPA National Exposure Research Laboratory in Cincinnati, Ohio, and was certified by the U.S. EPA as a member of the regional certification team for microbiology. In July 2003, with the addition of this new certification officer, sufficient resources became available to implement a schedule of 3 microbiology laboratory inspections on average per month (i.e., an aggressive three-year inspection cycle).</p>	<p>In-state Laboratories 83 laboratories are located in Massachusetts: 32 are certified to analyze one or more chemical contaminants in potable water; 69 are certified to analyze for microbiological contaminants.</p> <p>Out-of-state Laboratories There are 58 laboratories located outside Massachusetts: 56 are certified to analyze one or more chemical contaminants in potable water; 10 are certified to analyze for microbiological contaminants.</p> <p>By December 31, 2004, the Laboratory Certification Office (LCO) had completed all outstanding microbiology on-site inspections.</p> <p>The decrease in the number of chemistry on-site inspections during FFY2004 is the result of the need to dedicate time and resources to the review and approval of laboratories to analyze drinking water for low-level perchlorate and to the review of data packages from the analysis of drinking water for low-level perchlorate. Despite the decreased frequency of chemistry inspections, all certified chemistry laboratories have been inspected well within the past three years. Current staffing permits the LCO to maintain, at the least, a three-year inspection cycle for both microbiology and chemistry laboratories as required by EPA.</p>	<p>In-state Laboratories 79 laboratories are located in Massachusetts: 35 are certified to analyze one or more chemical contaminants in potable water; 70 are certified to analyze for microbiological contaminants.</p> <p>Out-of-state Laboratories There are 51 laboratories located outside Massachusetts: 51 are certified to analyze one or more chemical contaminants in potable water; 10 are certified to analyze for microbiological contaminants.</p> <p>As of December 31, 2004, all microbiology laboratories have been inspected within the last three years and the inspection schedule is on track as agreed to in the Performance Partnership Agreement.</p> <p>Both chemistry and microbiology inspections continue on a schedule to ensure at least a three-year cycle of inspections.</p>
# of capacity development reviews	<p>Community and Non-transient non-community systems: 140 systems (19 %).</p> <p>Transient non-community systems: 46 systems (5%).</p>	<p>Community and Non-transient non-community systems: 157 systems (21 %).</p> <p>Transient non-community systems: 56 systems (7%).</p>	<p>Community and Non-transient non-community systems: 166 systems (22 %).</p> <p>Transient non-community systems: 30 systems (3 %).</p>
# of operators certified or recertified	• 3,968	• 4,542	• 3,952
# of water quality monitoring reports reviewed	N/A	- 30,000 (Estimate)	- 30,000 (Estimate)
# of monitoring waivers reviewed and granted	187 VOC waiver applications reviewed and 115 granted. 235 IOC waiver applications reviewed and 145 granted. 238 SOC waiver applications reviewed and 120 granted.	504 VOC waiver applications reviewed and 260 granted. 590 IOC waiver applications reviewed and 493 granted. 602 SOC waiver applications reviewed and 485 granted.	369 VOC waiver applications reviewed and 165 granted. 404 IOC waiver applications reviewed and 377 granted. 726 SOC waiver applications reviewed and 635 granted.
Regulatory changes	On 12/6/02, DEP issued final regulations for the Filter	On 4/23/04, DEP issued final regulations revising the	None.

Outputs	FFY 2003	FY 2004	FY 2005
	<p>Backwash Recycle Rule (FBRR), the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), Radionuclides Rule, and for modifications to the existing Arsenic Rule, including a new Maximum Contaminant Level.</p>	<p>Drinking Water Regulations (310 CMR 22.00) to incorporate technical corrections to sections 22.20.A and 22.20D, based on the EPA review of the Primacy Package for the Interim Enhanced Surface Water Treatment Rule.</p> <p>Additionally, on 4/23/04 DEP issued final regulations revising the Laboratory Certification Regulations (310 CMR 42.00) to incorporate technical corrections to sections 42.05 and 42.19, based on the EPA review of the Primacy Package for the Disinfectants/Disinfection Byproducts Rule.</p>	
<p>Increased level of enforcement</p>	<p>DEP continued to implement its enforcement strategy. DEP used several innovative tools to enhance enforcement, including working in partnership with the Massachusetts Board of Certification of Drinking Water Operators to initiate pre-enforcement action against 30 certified operators that provided oversight to public water systems with 5 or more violations. DEP also worked in partnership with the Massachusetts Department of Public Health and local boards of health to initiate suspension or revocation of local permits whenever there was overlapping jurisdiction with recalcitrant public water systems. DEP continued to use one-page electronic notices of non-compliance and pre-determined penalty assessment notices.</p> <p>DEP continues to work to improve Boston-regional coordination.</p>	<p>DEP continued to implement its enforcement strategy and use electronic tools to expedite enforcement. DEP updated its Drinking Water Comprehensive compliance evaluation to remove the 6-month enforcement forbearance for newly discovered existing TNCs with large daily consumer rates. DEP targeted transient non-community systems with large daily consumer rates for registration evaluation and enforcement. e.g. gas stations</p>	<p>DEP continued to implement its enforcement strategy and use electronic tools to expedite enforcement. DEP targeted daycare facilities that were unregistered public water systems, for registration and enforcement.</p>

Outputs	FFY 2003	FY 2004	FY 2005
Technical assistance to public water suppliers	<p>433 technical assistance visits to public water systems as part of the SWAP Program outreach.</p> <p>9 Vegetation Management Panel (VMP) technical assistance meetings.</p> <p>Wellhead protection assistance resulted in 112 sources being protected.</p> <p>50 technical electronic training encounters on distribution protection were completed.</p> <p><i>In addition, 369 public water systems had 494 technical assistance encounters as a result of SRF set-asides funding.</i></p> <p><i>Technical assistance was also targeted to specific groups including non-governmental agencies (NGOs) and certified operators, schools, boards of health, mobile home parks, and campgrounds.</i></p>	<p>235 technical assistance visits to public water systems as part of the SWAP Program outreach.</p> <p>10 surface water supply plans developed.</p> <p>5 Vegetation Management Panel (VMP) technical assistance meetings.</p> <p>Technical assistance provided on 1 open space plan, 3 storm water management plans, and 1 forest management plan and 2 water supply protection by-laws. 3 meetings/conferences on community participation in drinking water protection</p> <p>186 technical electronic training encounters on distribution protection were completed.</p> <p>In addition, 369 public water systems had 494 technical assistance encounters as a result of SRF set-asides funding.</p> <p>13 water systems (55 sources) received wellhead protection compliance assistance. 8 water systems received assistance to develop wellhead protection plans. 56 water systems were assisted with source water protection criteria for use with monitoring waivers. 6 systems were assisted with source protection conditions for their water management permits. 31 communities were assisted with wellhead protection issues related to zoning, health regulations, land uses, land acquisition, storm water run off and EOE land acquisition grant application. 18 UIC trainings conducted and 3 guidance documents issued.</p>	<p>17 technical assistance visits to public water systems as part of the SWAP Program outreach (new systems).</p> <p>11 surface water supply plans developed.</p> <p>6 Vegetation Management Panel (VMP) technical assistance meetings.</p> <p>Technical assistance provided on 1 open space plan, 2 storm water management plans, and 1 forest management plan and 4 water supply protection by-laws. 3 meetings/conferences on community participation in drinking water protection.</p> <p>286 technical electronic training encounters on distribution protection were completed. 248 public water systems attended one of three cross connection workshops. In addition, 301 public water systems had 405 technical assistance encounters as a result of SRF set-asides funding.</p> <p>54 water systems (92 sources) received wellhead protection compliance assistance. 7 water systems received assistance to develop wellhead protection plans. 221 water systems were assisted with source water protection criteria for use with monitoring waivers. 10 systems were assisted with source protection conditions for their water management permits. 30 communities were assisted with wellhead protection issues related to zoning, health regulations, land uses, land acquisition, storm water run off and EOE land acquisition grant application. 16 UIC technical assistance trainings conducted; UIC registration forms updated and several fact sheets released.</p>

Outputs	FFY 2003	FY 2004	FY 2005
In 2004 DEP will: a) work with MWRA and member communities to address comments on MWRA's sampling plan for lead and copper; b) respond to an invalidation request by MWRA on the September 03 sampling; c) establish water quality control parameters for optimal corrosions control treatment; d) address any item relating to the MWRA's notice of noncompliance and compliance with the Lead and Copper Rule; and e) continue to coordinate with EPA to address regional and national inquiries relating to overall compliance with the Lead and Copper Rule.	N/A	DEP a) worked with MWRA and member communities to address comments on MWRA's sampling plan for lead and copper; b) responded to an invalidation request by MWRA on the September 03 sampling; c) set out a plan to establish water quality control parameters for optimal corrosions control treatment; d) addressed MWRA's notice of noncompliance and compliance with the Lead and Copper Rule; and e) continued to coordinate with EPA develop and provide training for MA PWSs on compliance with the Lead and Copper Rule.	N/A
# of GWUDI, # sources EXEMPT by GIS Methods; # of Sources exempt by field evaluation: # GWUDI sources NON-EXEMPT	<ul style="list-style-type: none"> N/A 	<p>In 2004 there were 1501NTNCs</p> <ul style="list-style-type: none"> Sources potentially subject to the GWUDI. Of these, 1454 were exempt by field evaluation. 47 sources were not exempt. Of the 47 non-exempt sources 9 are conducting MPA testing, 1system/source is planning to install filtration and 37system/ sources are in the process of deciding an action plan. 	<ul style="list-style-type: none"> In 2005 there were 1499 non-community groundwater sources. Of these, 1450 were exempt by field evaluation. 47 sources were not exempt. Of the non-exempt sources 5 were closed, 15 are conducting MPA testing, 11 are making source improvements or replacing the well, 2 are planning to install filtration and 14 are still deciding on an action plan.
# of loans to assist in achieving compliance with SDWA requirements	<ul style="list-style-type: none"> 16 loans. 	<ul style="list-style-type: none"> 28 loans 	<ul style="list-style-type: none"> 22 loans
# of source protection plans reviewed and approved	34 source protection plans reviewed and approved (4 ground water; 30 surface water).	33 source protection plans reviewed and approved (33 ground water).	18 source protection plans reviewed and approved (7 ground water; 11 surface water).
# of source water assessments	215 final assessment reports.	645 final assessment reports	17 final assessment reports (new systems)
# of Water Management Act (WMA) permits for sources pumping more than 100,000 gallons per day	17 WMA permits and 8 WMA permit amendments were issued.	14 WMA permits and 5 WMA permit amendments were issued.	6 WMA permits were issued (no WMA permit amendments).

- Trend Analysis

DRINKING WATER

From 1999 to 2005 several trends emerge in DEP's work to advance the goal of ensuring that every public water supply consistently provides water that is safe to drink. See <http://www.mass.gov/dep/water/priorities/dwhome.htm>.

List of References of work products submitted or available

Work products

- In The Main - Quarterly newsletter had 50 articles (including 11 in our annual TNC issue) to educate the PWS and consultants about DW issues.
- Drinking Water Director's quarterly email to public water systems with email addresses

DEP promoted the following events

- Annual Compliance Awards Program - Governor proclamations to 39 winning systems brings awareness to the public of importance of DW.
 - Theatre for Children presentations at local schools- May 2-6, 2005, held 34 performances at 18 schools to teach children importance of drinking water.
-

Goal 3: Preserve and Restore the Land

Goal 4: Healthy Communities and Ecosystems

RCRA Corrective Action Sites

- *Environmental Indicators and other Performance Measures*

Outcomes	BASELINE	YEAR PRIOR TO MOST RECENT	MOST RECENT DATA
Tons of hazardous waste shipped by Large Quantity Generators (Based on the most recent Biennial Report)	Based on Biennial Report covering CY 1999 submitted in CY 2000	In 2001: 55,862 tons shipped Based on Biennial Report covering CY 2001 submitted in CY 2002	In 2003: 60,567 tons shipped Based on Biennial Report covering CY 2003 submitted in CY 2004 (Most up to date data)
Weight or volume of household hazardous wastes collected and reused, recycled or properly disposed	13,367 tons in CY 2003	13,367 tons in CY 2003	9,330 tons in CY2004
Total (# of tons) municipal solid waste generated (calendar year)	CY2000: 7,990,000 tons	CY2003: 8,460,000 tons	CY2004: 8,720,000 tons
Annual amount (# of tons) of solid waste diverted relative to the amount generated (calendar year)	CY2000: All Waste: 6,500,000 tons= 50% MSW Only: 2,700,000 tons= 34%	CY2003: All Waste: 6,860,000 tons= 52% MSW Only: 2,870,000 tons= 34%	CY 2004: All Waste: 7,580,000 tons= 54% MSW Only: 3,070,000 tons= 35%
Amount of solid waste disposed in landfills, resource recovery facilities relative to the total generated in-state (calendar year)	CY2000 All Waste: 6,460,000 tons = 50% MSW Only: 5,290,000 tons= 66%	• CY2003: All Waste: 6,340,000 tons = 48% MSW Only: 5,590,000 tons = 66%	• CY 2004: All Waste: 6,360,000 tons = 46% MSW Only: 5,650,000 tons = 65%
# of unlined landfills properly closed with impermeable caps	BASELINE: In 1991 over 100 unlined landfills were operating. All these Landfills have been closed properly capped. Ongoing capping is for the closure of cells at active lined landfills as they reach capacity	In CY04 117 acres were capped at active landfills	In CY 05 117 acres were capped at active landfills
# of landfill sites authorized for reuse for open space and/or recreation	There are potentially hundreds of old landfill sites that could be developed for post-closure use. In FFY02, a total of 3 landfill sites were authorized for reuse.	In FFY04, a total of 7 landfill sites were authorized for reuse	In FFY05 12 landfill sites were authorized for new or modified reuse activities

Outputs	2 YEARS PRIOR TO MOST RECENT DATA YEAR	CY 2003	CY 2004 (MOST RECENT DATA)
Amount of solid waste	76,257 tons in 2002	78,097 tons in 2003	80,863 tons in 2004

Outputs	2 YEARS PRIOR TO MOST RECENT DATA YEAR	CY 2003	CY 2004 (MOST RECENT DATA)
diverted from the waste stream through Bottle Bill redemptions			
Grant dollars distributed	Distributed \$ 3.66 Million in calendar year 2003 <ul style="list-style-type: none"> ➤ \$2.95 million in recycling equipment and consumer education grants ➤ \$0 in grant assistance to redemption centers* ➤ \$120,000 in assistance to business recycling and research* ➤ \$160,000 in waste reduction public education and outreach ➤ \$180,000 in Recycling Industry Reimbursement Credit ➤ \$250,000 in waste reduction research and pilots 	Distributed in \$2.15 Million calendar year 2004 <ul style="list-style-type: none"> \$1 million in recycling equipment and consumer education grants \$750,000 in grant assistance to redemption centers \$142,000 in assistance to business recycling and research 153,500 in Recycling Industry Reimbursement Credit \$100,000 in waste reduction research and pilots 	Distributed \$2.0 million in CY2005: <ul style="list-style-type: none"> \$600,000 in recycling equipment, technical assistance and consumer education grants \$1.265 million in grant assistance to redemption centers \$35,000 in recycling assistance to businesses 50,000 in Recycling Industry Reimbursement Credit \$30,000 in waste reduction research and pilots

Trend Analysis

SOLID WASTE MANAGEMENT

Massachusetts overall waste reduction rate has increased from 57% in 2002 to 60% in 2004. The state's goal is to reach a 70 % waste reduction rate by the year 2010. Massachusetts also has set a goal to reach a 56 percent overall recycling rate by 2010. The overall recycling rate increased slightly from 47 percent in 2002 to 48 percent in 2004.

In 2004, total waste generation increased five percent from 2003. This compares to a two percent increase from 2000 to 2003. The amount of waste disposed in 2004 increased by 0.3 percent from 2003. From 2000 to 2004, total disposal has essentially remained level, between 6.3 and 6.5 million pounds. The state's MSW recycling rate (excluding home composting) increased slightly from 34 % in 2003 to 35% in 2004. Other diversion of construction and demolition debris, which includes use in inactive landfill closures and as landfill daily cover, increased from 300,000 tons in 2000 to 860,000 tons in 2004.

Environmental Indicators and other Performance Measures

Environmental Indicators	Baseline	CY 2003	CY 2004
•	Air releases of hazardous air pollutants decreased by 62% from 1990 to 2001, from 15.7 to 5.9 million pounds	Air releases of hazardous air pollutants decreased by 70% from 1990 to 2002, from 15.7 to 4.7 million pounds	Air releases of hazardous air pollutants decreased by 69 % from 1990 to 2003, from 15.7 to 4.9 million pounds
Fresh water fish tissue concentrations of mercury	0.38 mg/kg from 22 locations 397 fish	0.48 mg/kg from 18 locations 574 fish	.89 mg /kg from 24 locations

Outcomes	BASELINE	CY 2002	CY2003 (most recent data)
% of non-product outputs reduced for TURA reporters	Reductions CY 2000 – 2001 =13%	Reductions CY2000 – C20002 =18%	Reductions CY2000 – C20003 = 22%
% of non-product outputs reduced for TURA reporters with waste normalized for production	Reductions CY 2000 – 2001 = 9% adjusted for production -	Reductions CY2000 – C20002 = 9% adjusted for production	Reductions CY2000 – C20003=12% adjusted for production
Quantity (# of lbs.) of toxics used and generated as waste by-products (calendar year)(2000 Core Group)	CY 2000 Use: 1032 million pounds By product: 123 million pounds	CY 2002 Use: 989 million pounds Byproduct: 101 million pounds	CY 2003 Use: 918 million pounds Byproduct: 96 million pounds

Trend Analysis

MERCURY TRENDS

Over the past 8 years, MassDEP has engaged in an aggressive effort to divert mercury from the waste streams. This work has included a mix of one time and ongoing collection projects, changes to regulations governing emissions, and education and outreach.

Collection Projects:

- In CY 2000 1,645 pounds of mercury were collected through the MA Dental Society Mercury Collection Program. This effort involved cleaning out old stocks of mercury amalgam that were no longer needed due to changes in amalgam technology. It is expected that mercury collections will continue, but the yield of mercury amalgam will be much less, since the larger stockpiles were cleared out in CY 2000.
- In CY 2000 1.9 pounds of mercury were collected through the Thermostat Recycling Corporation's voluntary thermostat recycling program for professional plumbing and electrical supply contractors that sell directly to contractors. An additional 2.5 pounds were collected through this program in CY 2001. The program is continuing too date we have collected over 4000 thermostats .
- In CY2001 125 communities collected mercury containing items for diversion from the solid waste stream. In 2005 109 had these programs. Some of these collection efforts were sponsored by the Municipal Waste Combustors and contributed to the pounds reduction cited above. R Reimbursements to municipal collection programs for the costs of mercury recycling have supported the collection of 400,000 linear feet of fluorescent lamps and other mercury containing devices (and elemental mercury) estimated to contain between 250 and 300 kilograms of mercury;
- Support for fluorescent bulb recycling programs has led to the diversion of 4479 pounds of Hg in CY 2002 and 3606 pounds n CY 2003.
- In CY 2001 DEP supported the School Clean-out Pilot Projects through which 586 pounds of mercury were collected from 17 schools. This was in the form of jars of elemental mercury, thermometers, and barometers. An average of 14 pounds of mercury was collected per participating high school. Further school clean-out programs have been implemented as funds allowed.
- CY2001, DEP supported the Keep Mercury from Rising Pharmacy Thermometer Exchange which collected 168 lbs of mercury

Regulatory Changes

- In 1998, MassDEP promulgated stringent mercury emission limits on municipal waste combustors (MWCs) that were estimated to reduce mercury emissions from these facilities by 85%. The air pollution controls were to be in place by CY 2001. These regulations also required MWCs to implement the material separation plans by the same year. In the first year, implementation of these plans resulted in diverting from the waste stream 1,853.6 pounds of mercury contained in thermometers, switches, thermostats, fluorescent lamps and bulbs, and other miscellaneous products. This program has continued: In CY 2005 these plans diverted 1027

pounds of mercury from the waste stream Absent this requirement, much of this mercury would have ended up as air pollution.

TURA data shows that the combination of the emission controls and material separation plans have had a significant impact on Mercury emissions from MWCs: prior to this regulation it was estimated that MWCs emitted 5860 pounds of mercury annually In CY 2002 they released 538 pounds whereas in CY 2004 this had dropped to 386 pounds.

- In 2004 MassDEP worked with the Massachusetts Dental Society and dental offices to develop and implement a plan for dental offices to install amalgam separators, recycle all mercury- containing materials, and adopt best management practices voluntarily. Approximately 2/3rds of the dentists participated in the program and collectively prevented the discharge to wastewater of an estimated 220 pounds of mercury annually. In FFY 2005, MassDEP held public hearings on regulations requiring all dentists that had not participated in the voluntary program to take these actions by June 2006. (The regulations were promulgated in April 2006).
- Also in 2004 MassDEP promulgated stringent mercury emission limits on major power plants that will require the removal of 85% of the mercury in the emissions by 2008 and 95% removal by 2012. Total annual mercury emissions from these plants are expected to drop from 185 pounds per year currently to 86 pounds per year in 2008 to 29 pounds per year in 2012.
- 26 municipalities have adopted ordinances banning the disposal of mercury bearing items;

Education and Technical Assistance Programs

- MassDEP has worked with hospitals through onsite audits to educate them and to implement policy changes concerning solid, hazardous, and infectious waste management and pollution prevention measures. In particular, DEP strongly encouraged hospitals to reduce the use of mercury and PVC containing products, and institute safe collection, labeling, and recycling practices for unneeded mercury and PVC containing products.
- DEP provided a technical assistance grant to the South Central Recycling Association of Massachusetts for mercury audits, clean-outs and purchase of mercury-free replacement products at East Longmeadow High School and the Southwick School District.
- Continued DEP staffing of the Mercury Hotline, answering calls from residents about proper disposal of mercury, mercury spills, etc

This work has paid off: The Massachusetts Water Resources Authority has seen a marked drop in mercury concentrations in its sewage sludge: MWRA's Biosolid Pellet Analysis from February 04 through January 06 and show that the mercury levels have dropped from a high of 4.4 mg/kg, dry weight basis (May 04), to a low of 2.0 mg/kg, dry weight basis. Levels have been below 3.0 consistently since May 05. Equally tellingly, Massachusetts has been monitoring mercury concentrations in the tissue of yellow perch and large mouthed bass in Massachusetts lakes since 1999. These studies focused on suspected mercury "hot spots" in the northeastern part of the state, where there had been a concentration of higher mercury emissions. Between 1999 and 2004, Nine of the lakes sampled for yellow perch were in the northeastern section of Massachusetts and in eight of these lakes, the drop of mercury concentrations in yellow perch averaged 32.4%, and the average for other remaining lakes statewide showed a drop of 15%. Eleven of the lakes sampled for largemouth bass were in the northeast region and mercury levels from seven of these decreased an average of 24%, and the decline over the other remaining lakes statewide was 19%.

BYPRODUCT GENERATION TRENDS FOR LARGE QUANTITY TOXICS USERS

Byproduct is a measure of the efficiency with which companies use toxic chemicals. The byproduct is the amount of a given chemical that is "wasted" during the production process: that is, it is neither converted into another chemical during production (such as using one chemical to manufacture another compound at a chemical manufacturing plant) or is not incorporated in the product – as copper might be incorporated into a pot, or as a solvent might be incorporated into a can of paint. Some byproduct gets destroyed through pollution control equipment, but that which pollution control technology does not destroy leaves the site as emissions, hazardous waste, or discharges.

Changes in byproduct generation, normalized for changes in production levels, is a good measure of pollution prevention techniques, such as input substitution, improved production processes, or production equipment operation and maintenance.

Between 1990 and 2003, after normalizing for changes in production levels, the Core Group of TURA facilities reduced their byproduct generation by 68%, showing that these facilities used pollution prevention to increase efficiency and reduce waste.

For the 2000 Core Group of facilities for the period between 2000 and 2003 byproduct dropped by 22 %. This decline was 12% when the data was normalized for the decrease in production that occurred over that time period.

Objective

• **Oversee Clean-ups at RCRA Corrective Action Sites**

Environmental Indicators and other Performance Measures

Environmental Indicators	FFY 2002	FFY 2004	FY 2005
Groundwater releases controlled (RCRA related)*	➤ 4 -- high priority TSD	➤ 0	➤ 0
Activities targeted at controlling or preventing the spread of contamination, preventing human exposure to such releases, and reducing the risk to human exposure and the environment* as measured by:		Coordinated the establishment of a new 2008 GPRA Baseline with EPA .	
• % of 26 listed corrective action sites at which assessment is complete (Goal 100% by '08)	Data not available	Data not available	83%
% of 26 listed corrective action sites at which human health exposure controlled* (Goal 95% by '08)	Data not available	Data not available	80% (estimated)
• % of 26 listed corrective action sites at which groundwater contamination controls in place (Goal 80% by '08)	Data not available	Data not available	80% estimated
• % of 24 listed corrective action sites for which corrective final remedy decision made,	Data not available	Data not available	0%
% of 26 listed corrective action sites at which corrective action decision implemented* (Goal 20% by '08)	Data not available	Data not available	0%

* ECOS Core Performance Measure

Outcomes	FFY 2003	FFY 2004	FFY 2005
Activities targeted at controlling or preventing the spread of contamination, preventing human exposure to such releases, and reducing the risk to human exposure and the environment[±]	<ul style="list-style-type: none"> ➤ 1 oversaw state contractor removal of over 500 barrels and containers of hw from an abandoned TSDF ➤ 1 RCRA Non Notifier HW disposal ➤ 1 Hazardous Waste Land Disposal Facility continued hydraulic containment and corrective action plan was approved. 	<ul style="list-style-type: none"> ➤ 1 - Revised Stabilization Measure reviewed/approved for General Chemical in June 2004. 	1-Soil RAM Plan oversight at Handy and Harmon
% of hazardous waste managed at Treatment, Storage, and Disposal Facilities (TSDFs) with approved controls in place*	100%	100%	100%
# of non GPRA hazardous waste facilities where corrective actions have been implemented	In FFY03, state oversaw closure: 1 Lagoon	None	1- RAM Plan oversight of HCC

- **Overview of the Waste Site Cleanup Universe**

	FY 2002	FY 2003	FY 2004	FY 2005	Program to Date
Number of notifications in BWSC's database ³	27,295	29,132	31,008	32,843	32,843
Number of unique sites ⁴	23,817	25,486	27,236	28,992	28,992
Number of sites in BWSC's database that are closed (e.g., Response Action Outcome, NFA)	15,769 (66.2%)	17,686 (69.4%)	20,182 (74.1%)	22,498 (77.6%)	22,498 (77.6%)
Number of sites in BWSC's database that are open	8048	7800	7054	6494	NA
Number of new notifications ⁵	1962	1837	1876	1835	32,843
- number of 2-hour notifications (e.g., sudden releases, spills)	931	996	1005	968	12,432
- number of 72-hour notifications (e.g., LUSTs)	452	300	326	354	6,382
- number of 120-day notifications (e.g., historic releases)	578	541	545	513	7,069
Number of Response Action Outcomes (RAOs) submitted ⁶	1962	1917	2496	2316	21,352
Number of RAOs allowing Unrestricted Site Use ⁷	1420	1698	2256	2037	19,130
Number of RAOs with Activity and Use Limitations (AULs)	492	169	152	134	1,580

³ These figures represent the number of notifications submitted from the beginning of the Waste Site Cleanup program in 1985. Other data below are a subset of that total, and include only notifications received under the revised cleanup program, which began in late 1993.

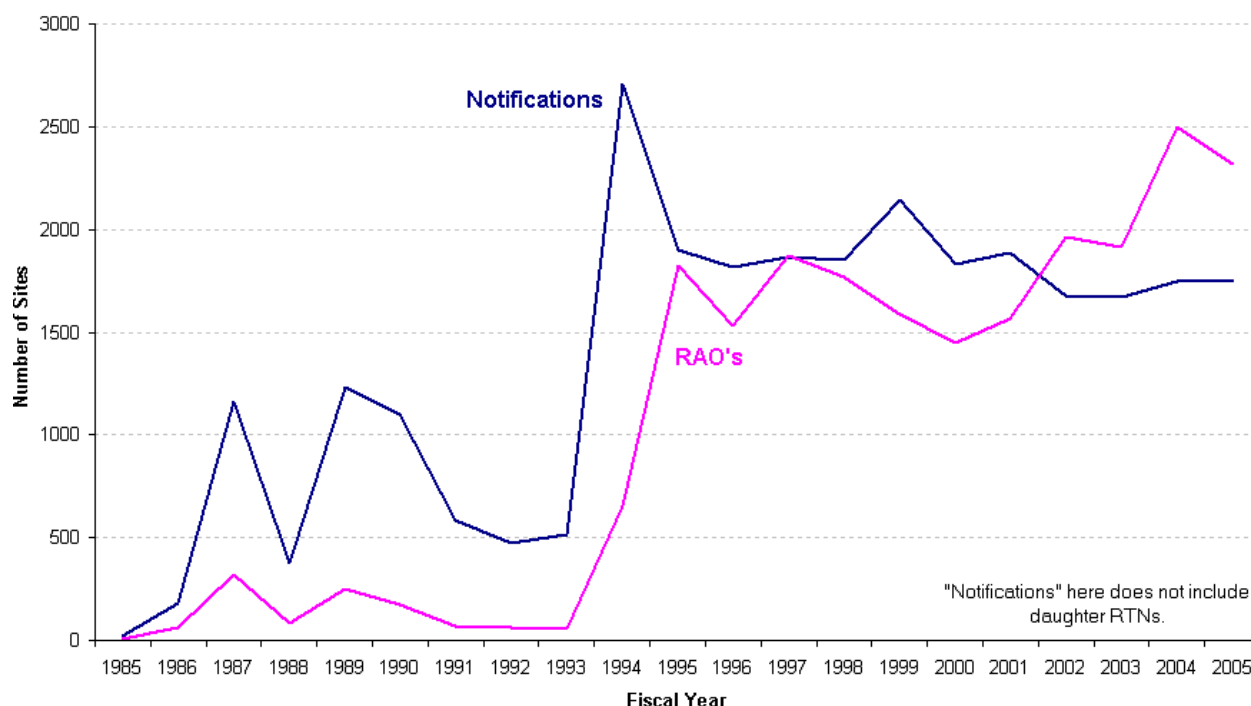
⁴ Multiple releases at a location may be combined and assessed under a single Release Notification Number ("RTN"), or incorrect notifications may be retracted.

⁵ This is the total number of notifications, some of which may later be combined with other RTNs for the same site. The "Program-to-Date" sum includes the pre- and post-1993 notifications. The post-1993 regulations specify the 2-hr, 72-hr and 120-day notification categories.

⁶ "Program-to-Date" includes only post-1993 closures. Parties have 6 years from the date of release notification to achieve an RAO (absent an extension), so only a portion of releases in a calendar year achieves RAO in the same year.

⁷ "Program-to-Date" includes only post-1993 closures: Response Action Outcomes.

**Sites Coming In and Closing Out:
Notifications and RAO's
Federal FY1985-2005**



Analysis

The number and percentage of sites that are closed continues to increase; since FY2002 the number of sites closed out each year has exceeded the number of new notifications, indicating a steady decline in the number of “active” sites. Ninety-eight percent (98%) of the sites closed since 1994 (under the privatized program) achieve a Permanent Solution, and ninety-three percent (93%) are acceptable for unrestricted use (no institutional control, or “Activity and Use Limitation”).

Regulations

- Final Oil Spill Prevention and Response Regulations, March 2005

Other Work Products

- Question and Answer Fact Sheet - Notification, Tier Classification and Response Action Deadlines, Response Action Outcomes, Fees and Forms, October 2004
- DEP Brownfields Success Stories, June 2005

Objective

- **Maximize Risk Reduction at Waste Sites**

Work to ensure that PRPs achieve a compliance rate of at least 75 percent for Immediate Response Action (IRA) submittal requirements, measured one year after discovery of the condition requiring the IRA.

Targets

- Ensure Implementation of Mandatory Risk Reduction Measures
- Oversee and Perform Emergency Response Activities
- Address Serious Risks Using Public Funds with State Contractors
- Triage
- Provide Direct Oversight of Response Actions at the Most Complex Sites

2005 highlights in meeting goal

In FY 2005, DEP was successful in advancing this goal:

- Each regional office initiated a project to review the status of 21E sites within 1000 feet of the schools in a major city (<http://mass.gov/dep/cleanup/sites/school.htm>)
- Prepared documents to explain perchlorate contamination and recommend ways to control/contain it (<http://mass.gov/dep/water/drinking/percinfo.htm>)

Environmental Indicators and other Performance Measures

	FY2002	FY2003	FY2004	FY 2005	Program to Date ⁸
<i>Ensure that PRPs achieve a compliance rate of at least 75 percent for Immediate Response Action (IRA) submittal requirements, measured one year after discovery of the condition requiring the IRA.</i>	N/C	N/C	91%	94%	N/A
Number of RAMs/IRAs conducted	2,068	1,956	1,817	1,745	26,175
<u>Number of sites at which DEP took response actions</u>	121	102	95	88	N/A
Amount DEP spent on response actions	\$7,236,465	\$6,107,829	\$4,574,284	\$6,756,839	N/A
Number of RAOs submitted in the same year as notification received ⁹	1276	1285	1149	1005	13,900
Number of LUST cleanups initiated	95	89	94	94	N/A
Number of LUST cleanups completed	132	225	339	311	N/A

⁸ Program-to-Date values (through FY04) are provided where available and when applicable.

⁹ This count is for post-1993 notifications and RAOs. In addition to those sites with RAOs, approximately 5 percent more reach a liability endpoint via DPS and ROS.

	FY2002	FY2003	FY2004	FY 2005	Program to Date ⁸
Number of enforcement actions	631	812	825	1131	6254

- *Analysis*

The percent of PRPs in compliance with IRA conditions one year after the condition is discovered increased 3 percent over 2004. This increase may be attributable to the attention brought to this issue by draft regulations on reporting on the status of remedial systems that were circulated for public comment during this time.

The number of RAOs received within 1 year of notification has slightly decreased over this period, roughly reflecting a decrease in total notifications. The number of enforcement actions has increased dramatically reflecting a MassDEP-wide effort.

Regulations

None

Other Work Products

- Oil Spill Act Interim Guidance, Fall 2004
- Oil Spill Act Fact Sheet, March 2005
- Perchlorate: Letter to Blasting Contractors and Interested Parties Potential Environmental Contamination From the Use of Perchlorate-Containing Explosive Products, March 2005
- The Occurrence and Sources of Perchlorate in Massachusetts – draft report, August 2005
- Evaluation of Perchlorate Contamination at a Fireworks Display Dartmouth, Massachusetts – draft report, September 2005

Objective

- ***Increase the rate of privatized clean-ups***
- Work to ensure that Response Action Outcome or Remedy Operation Status statements are submitted within 6 years of release notification for at least 85 percent of sites

Targets

- Enforce Against Parties Not Performing Cleanups
- Streamline and Maintain Compliance Tracking Systems
- Encourage Deadline Compliance by collecting Annual Compliance Fees

2005 highlights in meeting goal

- 86 percent of RAOs/ROSs statements were submitted within the MCP timeframe, a rate higher than the established goal

- *Environmental Indicators and other Performance Measures*

	FY 2002 notifications in 1996	FY 2003 notifications in 1997	FY 2004 notifications in 1998	FY 2005 notifications in 1999	Program to Date ¹⁰
<i>Work to ensure that Response Action Outcome or Remedy Operation Status statements are submitted within 6 years of release notification for at least 85 percent of sites</i>	N/A	N/A	86%	86%	N/A
Number of sites with RAOs by the 6-year deadline	1,598	1,910	1,950	2,055	NA ¹¹
Percentage of sites with RAOs by the 6-year deadline	87.8%	86.7%	87.1%	86.5%	NA
Average duration to reach RAO ¹²					
- following 2-hour notifications	261 d	264 d	228 d	236 d	224 d
- following 72-hour notifications	1.9 yr	1.6 yr	1.5 yr	1.7 yr	1.6 yr
- following 120-day notifications	2.1 yr	1.8 yr	1.8 yr	1.8 yr	1.7 yr
Range of duration to reach RAO (5 th to 95 th percentile)					
- following 2-hour notifications	0 d – 1.0 yr	15 d – 1.7 yr	0 d – 1.0 yr	4 d – 1.3 yr	NA
- following 72-hour notifications	16 d – 2.4 yr	22 d – 2.3 yr	27 d – 2.7 yr	31 d – 3.6 yr	NA
- following 120-day notifications ¹³	0 d – 4.0 yr	0 d – 3.0 yr	0 d – 3.2 yr	0 d – 3.8 yr	NA
Percent reduction in the number of Tier ID sites since FY2000 (sites at which private parties have not conducted response actions).	16%	15%	17%	22%	NA
Number of LSPs registered in e-DEP	N/A	N/A	19	34	53
Number of BWSC e-DEP submittals	N/A	N/A	76	462	538

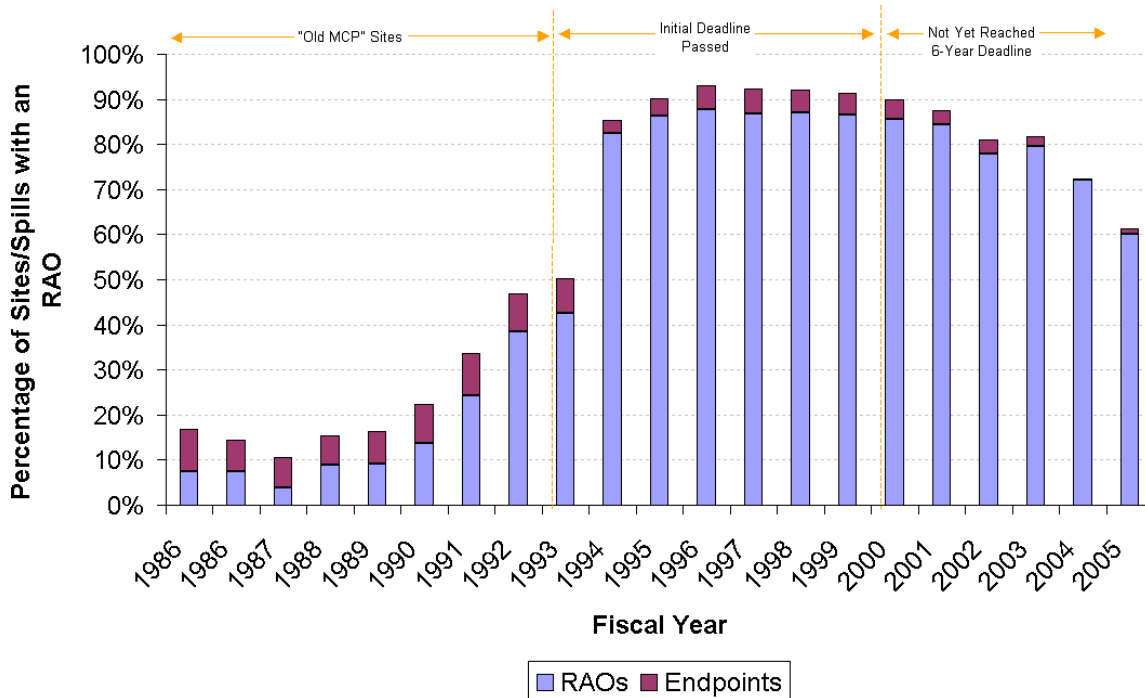
¹⁰ Program-to-Date values (through FY04) are provided where available and when applicable.

¹¹ Program-to-Data data is not calculated as two-thirds of the program years are either pre-1993 or the 6-year deadline has not yet passed.

¹² These durations apply only to post-1993 notifications.

¹³ The 5th percentile value, 0 days, indicates that the RAO was submitted on the same day as the notification.

Outcome of Sites and Spills Based on Notification Year



Analysis

BWSC stepped up the use of DEP-initiated response actions as a tool to reduce the number of default (“Tier ID”) sites. This and other enforcement efforts have resulted in a continuing reduction in the percentage of Tier ID sites.

The average time from notification to close-out (RAO) has been roughly consistent over time, with minor year-to-year fluctuations.

The bureau also instituted a comprehensive program that allows LSPs/PRPs to access and deliver BWSC forms and submittals electronically: the number of e-DEP users and e-submittals is increasing, despite deeply ingrained stakeholder skepticism.

Regulations

None

Other Work Products

None

Objective

- **Ensure the Quality of Cleanup at Waste Sites**

- Work to ensure that the number of sites receiving comprehensive compliance reviews or other dispositive compliance and enforcement follow-up, is at least equal to the number of sites recommended for such follow-up as the result of audits.
-

Targets

- Maintain Compliance Checks/Inspections for Privatized Cleanups
 - Conduct Enforcement to Address Noncompliance with MCP Performance Standards
 - Ensure that Policies and Regulations Promote Program Goals
 - Provide Direct Oversight for Federal Sites
-

2005 highlights in meeting goal

- The number of sites that exit the program by the 6-year deadline remained at a nearly constant level because of use of anniversary letters and other tools to encourage timely compliance

- *Environmental Indicators and other Performance Measures*

	FY2002	FY2003	FY2004	FY2005	Program to Date¹⁴
<i>Ensure that the number of sites receiving C&E follow-up is at least equal to the number of sites recommended for such follow-up in the preceding year.</i>	NA	NA	92%	96%	NA
Number of site audits conducted ¹⁵					
- Level 1 audits	1,022	1,987	2,255	2,511	NA
- Level 2 audits	252	199	221	311	NA
Number of audit and enforcement report findings articles written for publication in the LSPA News	10	5	4	6	NA
Number of audit case study training classes offered to LSPs	16	6	6	9	NA
Number of DEP-taught classes offered (excluding audit case studies)	11	0	6	14	NA

¹⁴ Program-to-Date values (through FY04) are provided where available and when applicable.

¹⁵ FY02 and FY03 values for the Level 1 and Level 2 audits were derived using a different methodology (counting “sites audited”) and may undercount the number of “site audits” conducted by approximately 2 percent.

	FY2002	FY2003	FY2004	FY2005	Program to Date ¹⁴
Number of targeted/random comprehensive audits	136 / 72	150 / 46	95 / 36	97/20	NA
Number of compliance inspections	1,387	1,245	1,400	1,286	NA
Number of higher level enforcement actions	217	159	217	222	NA
Number of LSPs and other environmental professionals attending DEP training	1,330	230	180	405	NA
Number of meetings with the LSPA Board	5	6	4	3	NA
Number of final or draft policies, guidance, fact sheets, and Q&As issued or revised	10	9	36	11	NA

- *Analysis*

MassDEP completed 2,782 audits, including audits of AULs, which were conducted through a combination of Level I, Level II, and Level III audits. Approximately 2,374 response action submittals received a Level I audit review (a 23 percent increase from last year). Response actions that appear to be inadequate or document significant violations are flagged for further review or enforcement action. Level II audit inspections were conducted at 282 sites to ensure remedial actions are being implemented in accordance with approvals or to verify compliance with an AUL (a 32 percent increase from last year). Level III audits were conducted at 126 sites (a 4 percent decrease from last year). Although 2,782 audits were performed during this period, only 1,754 counted toward the 20 percent mandate. Despite that fact, in FY 2005, MassDEP more than met the 20 percent by auditing 24 percent.

Higher-level enforcement actions continue to rise, reflecting a MassDEP-wide emphasis.

Regulations

None

Other Work Products

- Revised Audit Program Fact Sheet, December 2004
- WSC-CAM Analytical Notes - General MCP Analytical Method Clarifications and Changes Status, Final May 2005
- MassDEP Double-Blind Laboratory Evaluation Program, September 2005

Objective

- **Facilitate the Restoration and Redevelopment of Brownfield Properties**
 - Work to assist communities by implementing up to 10 brownfields site assessments (subject to funding)
 - Work to ensure that at least 10 percent of municipalities begin compiling brownfields inventories

Targets

- Coordinate, facilitate, provide technical assistance and on-site coordination
- Implement Brownfields Cooperative Agreement
- The targets described in “**Increase the rate and quality of privatized clean-ups**” above, apply equally to the rate of cleanup and opportunities for redevelopment of brownfields sites

2005 highlights in meeting goal

- Provided technical assistance to 80 brownfields project proponents
- Marketed 15 cost recovery/lien sites for redevelopment
- Assisted the Office of the Attorney General in negotiation of 20 CNTS Agreements

• Environmental Indicators and other Performance Measures

	FY 2002	FY 2003	FY 2004	FY 2005
<i>Work to assist communities by implementing up to 10 brownfields site assessments (subject to funding)</i>	4	4	4	5
<i>Incorporate into a newly developed database brownfields inventories generated by 20 municipalities</i>	N/A	N/A	20	N/A (developing separate inventory of technical assistance sites)
Number of cost recovery/priority lien sites where redevelopment was promoted	N/A	N/A	8	15
Number of public forums where DEP staff was a participant or speaker	N/A	N/A	15	30
Number of meetings held with regional coordinators	N/A	N/A	6	5
Number of state/federal partner meetings lead	N/A	N/A	12	12
Number of sites funded through UBSA/EJ that were provided with project management	N/A	8	2	N/A (project focus)

	FY 2002	FY 2003	FY 2004	FY 2005 changed)
Number of communities assisted that received EPA Cleanup Grants	N/A	N/A	12	10
Number of communities provided with proactive outreach	N/A	N/A	20	15
Number of communities assisted that received Brownfields Cleanup Revolving Loan Fund money	N/A	N/A	7	1
Number of brownfields project proponents that received assistance	N/A	N/A	55	80
Number of EDAs provided with technical assistance	N/A	N/A	45	50
Number of non-EDAs provided with technical assistance	N/A	N/A	10	13
Number of projects funded by other federal or state agencies that received technical assistance	N/A	N/A	25	20
Number of letters provided to public entities requesting assessment and cleanup grant funding	N/A	N/A	28	30
Number of Covenant Not to Sue applications DEP staff reviewed for the Attorney General's Office	N/A	N/A	21	20
Number of referrals accomplished to other state and federal programs	N/A	N/A	50	50

- *Analysis*

MassDEP continues to provide significant technical outreach to brownfields project proponents through the Boston and regional offices, as well as through website and presentations. Strong coordination continues between federal and state brownfields partner agencies, facilitated by monthly meetings led by MassDEP staff. The Massachusetts/Rhode Island Chapter of the National Brownfields Association (NBA) continues to increase its membership base, and MassDEP staff serves on the Executive Committee, and the Technical and Training Committee. MassDEP is taking an active role in planning for the upcoming Brownfields 2006 Conference scheduled for Boston.

Regulations

None

Other Work Products

- Question and Answer Fact Sheet - Notification, Tier Classification and Response Action Deadlines, Response Action Outcomes, Fees and Forms, October 2004

- DEP Brownfields Success Stories, June 2005
- Revised Audit Program Fact Sheet, December 2004
- WSC-CAM Analytical Notes - General MCP Analytical Method Clarifications and Changes Status, Final May 2005
- MassDEP Double-Blind Laboratory Evaluation Program, September 2005